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The Role of Carotid Ultrasound in Patients with Non-Focal Neurological Complaints

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Introduction/Background

- Carotid ultrasound (CUS) is still widely considered a routine part of the work-up for non-focal neurological complaints despite the lack of physiological indications for CUS in the absence of focal neurological signs and symptoms.
- Evidence demonstrates that CUS in patients with syncope is low-yield, does not provide additional information pertinent to diagnosis or treatment, and is not cost-effective
- While much cheaper than other types of imaging, unnecessary carotid ultrasonography still has the potential to affect healthcare spending
- In addition to a lack of established benefit, unnecessary testing with CUS may result in negative consequences associated with falsely positive test results.
- This study evaluates the results, clinical value, and impact on management of CUS among 224 patients presenting with non-focal neurological complaints.

Problem Statement

- To determine the prevalence of moderate and severe carotid stenosis among patients undergoing carotid ultrasound testing for non-focal neurological complaints and the effect of such testing on clinical management in order to assess the value of carotid ultrasounds in the aforementioned patient population.

Methods

- Retrospective chart review conducted at a large community-based health network.
- A single reader evaluated CUS performed on 224 consecutive patients presenting with non-focal neurological complaints over the course of 51 months.
- Patients with at least one focal neurological complaint were excluded.
- Stenosis was graded as absent/mild (<50%), moderate (50-69%), or severe (≥70%).
- Statistical analysis by means of the Kruskal-Wallis H test was conducted to assess for statistically significant differences in stenosis between cohorts with different non-focal neurological complaints.
- Records of patients with moderate or severe stenosis were evaluated for 1 year after the CUS to assess for changes in management, intervention, and/or symptomatology.

Results

- Patients ranged in age from 20 to 98, and included 47.3% (n=106) males and 52.7% (n=118) females.
- Among all 224 patients, 1.8% (n=4) had moderate stenosis and 3.1% (n=7) had severe stenosis [Table 1].
- Non-focal neurological complaints with which patients presented included syncope (n=132), dizziness (n=57), vertigo (n=9), blurred vision (n=7), headache (n=6), ataxia (n=9), amnesia (n=2), and disorientation (n=2).
- Statistical analysis revealed no statistically significant (p=0.949) difference in the distribution of stenosis between cohorts of different non-focal neurological complaints.
- Stenosis rates increased with age and were higher in males [Table 2].
- Of all those with severe stenosis, 3 underwent some kind of change to their medication regimen and 1 underwent CEA. Another patient was offered surgical intervention but declined [Figure 1]

Table 1. Rates of Stenosis by Non-focal Neurological Complaint

Non-focal Neurological Complaint	Patients with <50% Stenosis*	Patients with 50-69% Stenosis*	Patients with ≥70% Stenosis*	Total # of Patients
Blurred Vision	7 (100%)	0 (0%)	0 (0%)	7
Syncopal	124 (95.4%)	3 (2.3%)	5 (3.8%)	132
Ataxia	9 (100%)	0 (0%)	0 (0%)	9
Amnesia	2 (100%)	0 (0%)	0 (0%)	2
Dizziness	54 (94.7%)	1 (1.8%)	2 (3.5%)	57
Vertigo	9 (100%)	0 (0%)	0 (0%)	9
Disorientation	2 (100%)	0 (0%)	0 (0%)	2
Headache	6 (100%)	0 (0%)	0 (0%)	6
TOTAL	213 (95.1%)	4 (1.8%)	7 (3.1%)	224

* in at least 1 carotid artery

Table 2. Rates of Stenosis by Age in Men

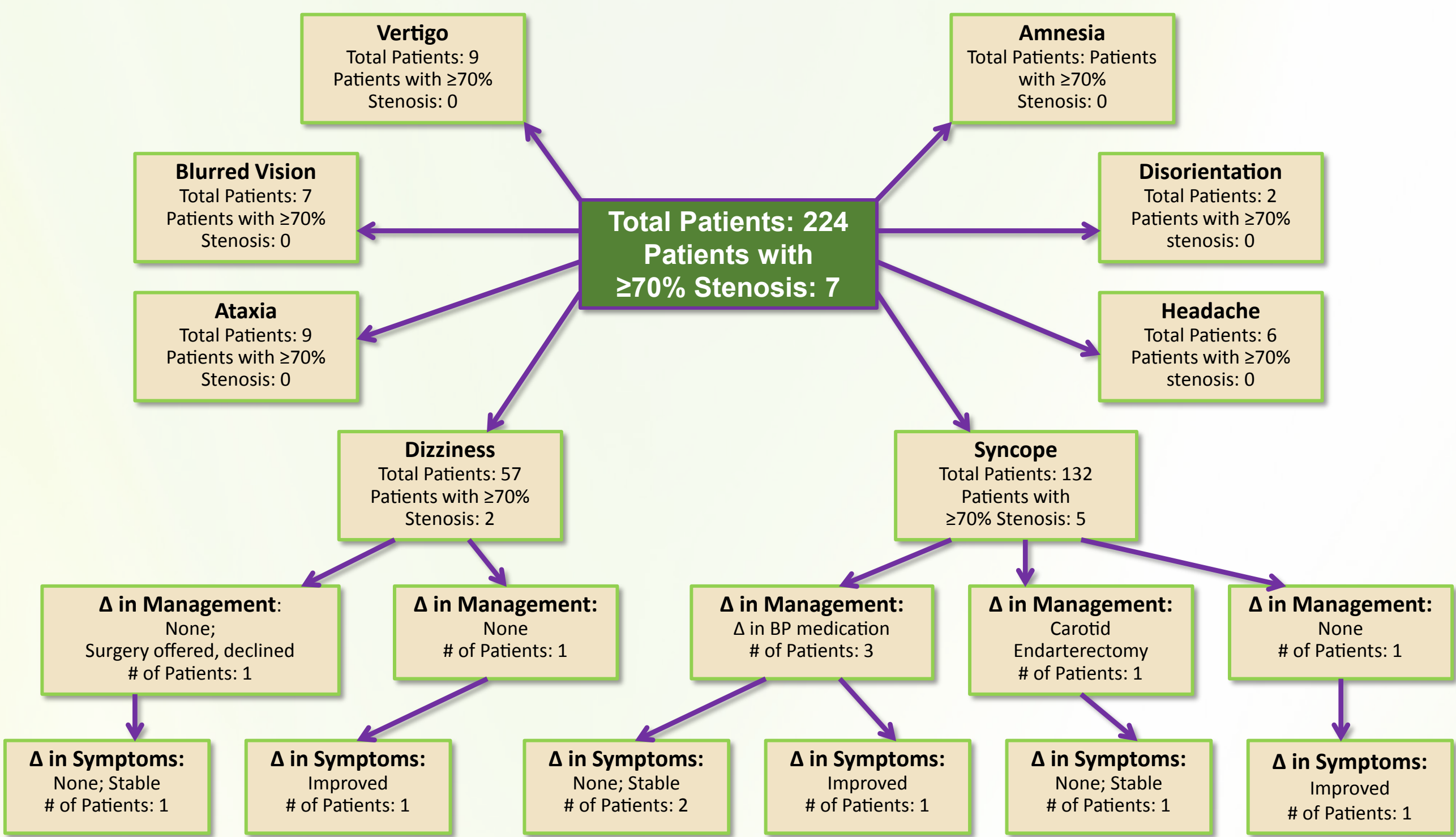
Age (in years)	Patients with <50% Stenosis*	Patients with 50-69% Stenosis*	Patients with ≥70% Stenosis*	Total
≥70	58 (90.6%)	2 (3.1%)	4 (6.3%)	64
50-69	31 (96.9%)	0 (0%)	1 (3.1%)	32
<50	10 (100%)	0 (0%)	0 (0%)	10

Rates of Stenosis by Age in Women

Age (in years)	Patients with <50% Stenosis*	Patients with 50-69% Stenosis*	Patients with ≥70% Stenosis*	Total
≥70	68 (94.4%)	2 (2.8%)	2 (2.8%)	72
50-69	32 (97%)	0 (0%)	1 (3.0%)	33
<50	13 (100%)	0 (0%)	0 (0%)	13

* in at least 1 carotid artery

Figure 1. Changes in Management and Symptoms in Patients with ≥70% Stenosis



Conclusions

- The prevalence of carotid artery stenosis in patients undergoing CUS for a non-focal neurological complaint is similar to that found in an asymptomatic neighborhood population.
- Following CUS, less than 2% of patients experienced a change in management.
- CUS testing appears to be low-yield in this population and of little clinical value regarding the diagnosis and treatment of the patients' presenting symptoms.
- This data demonstrates the need for change in the current practice of carotid ultrasonography in patients presenting with syncope or dizziness, as well as the need for additional study regarding the use and value of CUS in other general, non-focal neurological complaints